Teacher perceptions of the impact of peer learning in their classrooms: Using social interdependence theory as a model for data analysis and presentation

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Abstract

Peer tutoring is a structured process of co-operative learning, supported by social interdependence theory shown to have cognitive and affective level benefits. During a RCT, this study explores teacher perceptions (n=62) of effects of co-operative learning, including implementation issues, using a mixed methods approach during a 16-week peer tutoring intervention in 58 classes (10 secondary/high schools) in England. Data suggested strengthened peer relationships enhanced student learning. Teacher perceptions remained consistent and are congruent with social interdependence theory and research validating the theory. Implications for research, theory, practice and policy are discussed. Research was supported by Educational Endowment Foundation grant: Spring2012-105.

Keywords: peer-tutoring; co-operative learning; social interdependence theory; teacher co-production in RCT design.

1. Introduction

Studies have found significant links between positive peer relationships and achievement, with meaningful effect sizes. There is strong evidence that peer tutoring, a form of co-operative learning has a positive impact on both tutor and tutee outcomes (Cohen, Kulik & Kulik, 1982) and is a low cost intervention (Higgins, Katsipataki, Kokotsaki, Coleman, Major & Coe, 2013) which can be effective at scale across a wide geographic area (Author et al , 2011). Research in the cognitive benefits of peer tutoring is a mature area with extensive reporting. However, the social benefits of peer tutoring and the structure that needs to be in place for these to accrue are less well described in the literature. This paper seeks to build on the literature by providing evidence (using teacher perceptions) of what might be described as teachers "seeing and believing" social interdependence theory and the efficacy of cross-age peer tutoring, as an important ingredient for co-operative learning in the classroom.

This paper analyses some of the data drawn from a peer tutoring intervention in Northeast England, which used a randomised controlled trial (RCT) design, to test its effectiveness on reading outcomes and inclusion of 11-14 year olds across one academic year (with students nested in classes with 62 teachers from 10 different schools trained to deliver the intervention). The following research questions about teacher perceptions of peer tutoring as a form of co-operative learning and its impact on students are addressed in this paper:

1. What are teacher perceptions of the effects of peer tutoring on their students?
2. Do teacher perceptions of the impact of peer tutoring remain consistent throughout the programme and with existing evidence?
3. Are teacher views about the mechanisms and outcomes of peer tutoring for young people congruent with social interdependence theory and existing evidence about peer tutoring?

These research questions about teacher perceptions of peer tutoring in their classroom are addressed to offer additional evidence of the efficacy and mechanisms by which cross-age peer-tutoring affects student reading, communication, and peer relationships, including the social benefits of peer tutoring and the structure that needs to be in place for these to accrue.

1.1 *Social interdependence theory: a bases for co-operative learning*

Psychology and education experts advocate human interdependence to promote positive interactions between persons, which they suggest translates to enhanced outcomes when co-operative structures are present (Deci & Ryan, 2002; Johnson & Johnson, 2009; Roseth,

Saltarelli & Glass 2011). In this study there was specific focus on social interdependence theory, as a conceptual base for co-operative learning using peer tutoring.

According to Johnson, Johnson & Roseth: 'the way in which interdependence among goals is structured determines how individuals interact and the interaction pattern determines the outcomes of the situation' (2010). With regards to co-operative learning during peer tutoring the following structures are required:

- Goal structure (the pair work together with the aim of improving reading fluency and comprehension)
- Positive interdependence (in the tutoring process clear patterns for interaction are defined in the roles of tutor and tutee)
- Individual accountability (both the tutor and tutee have responsibilities where each must reflect on their own performance and the performance of their peer partner)
- Interaction patterns (the tutoring process is structured to stimulate promotive interaction, group processing and enhance social skills).

Social interdependence theory identifies motivation, achievement and positive attitudes for successful functioning (Johnson & Johnson, 1979; 2005). This theory offers an operational mechanism in the form of co-operative goal structures, which in education may be influenced by practitioners to enhance student motivation, interpersonal relationships and achievement. Social interdependence theory maintains that when one person's goals are structured co-operatively with an-other, motivation increases resulting in a sense of responsibility to contribute to the group, and achievement improves as individuals interact in ways that promote each other's success. In this sense, social interdependence theory predicts an interplay between positive social relationships and co-operative goal structures. As individual goals are achieved using co-operative structures, the success in achieving the goal leads to a positive emotional investment which is transferred to others resulting in positive relationships. Studies show that the expectation that another person will co-operate creates liking (Johnson & Johnson, 1972a; Johnson & Johnson, 1972b; Roseth *et al.,* 2008). Positive interdependence of this kind enhances relationships in which individuals encourage and facilitate each other's efforts to complete tasks and help one another achieve with a common group goal. This process involves a number of elements exemplified by behaviours including mutual assistance, sharing of needed resources, effective communication, mutual influence and trust (Johnson, Johnson & Smith 2007).

Effective co-operation in the classroom is based on skilled teamwork as well as on task work. Through these processes, students learn interpersonal skills necessary for co-operation and are motivated to use these. These involve students (1) getting to know and trust one another, (2) communicating accurately, (3) accepting and supporting each other, and (4) resolving conflicts constructively. When validating the theory, Johnson and Johnson suggest that these social skills promote higher achievement and contribute to building more positive relationships among group members (2009).

Social growth from co-operative learning is more likely if the activity is preceded by a period of preparation. Training students in social skills which enable positive relationships and promote discussion are recommended (Kutnick & Manson, 1998). Preparation for the management of discussion enables successful co-operation among students (Wegerif, 2000). Studies which test the benefits of this kind of preparation demonstrate its positive effect on student engagement in group work and on their ability to communicate well (Blatchford *et al.,* 2006; Kutnick, Ota & Berdondini, 2008). A meta-analysis of 148 studies shows that in students (12-15 years) achievement is strongly related to interpersonal perception (Roseth *et al.,* 2008). These researchers suggest that positive relations are a related consequence of the processes giving rise to positive achievement rather than a pre-requisite for effective co-operative learning and achievement. (Roseth *et al.,* 2008).

Social interdependence theory provides a rich theoretical base for co-operative learning which teachers have adopted across the education spectrum, and which has been tested resulting in positive effects (Johnson, Johnson & Smith, 2007; Johnson & Johnson, 2009). The positive impact of co-operative learning is evident from a meta-analysis where consistency of the results and diversity of the co-operative learning methods provide validation for its effectiveness (Johnson & Johnson, 2002). Later studies support these findings and indicate that for early adolescents, co-operative goal structures are associated with higher levels of positive peer relationships (Johnson & Johnson, 2005; Roseth *et al.*, 2008). Owing to the extensive research evidence in this area, experts support the widespread use of co-operative learning in education and suggest it as a great success of social and educational psychology, where theory, research and teacher practice interact effectively (Johnson & Johnson, 2002).

In 2005, Johnson and Johnson had already reported over 750 studies in the area of social interdependence. Focusing on high quality studies they report a mean effect size range of +0.45 to +0.88 for the impact of co-operation in social interdependence on dependant variables including achievement and social support (Johnson & Johnson, 2005). Positive effects of co-operative learning include improvements in participants' conceptual grasp and application of skills (Howe & Tolmie, 1998; Johnson & Johnson, 1979), and positive social relations (Blatchford, Baines, Rubie-Davies, Bassett & Chowne, 2006; Roseth, Johnson & Johnson, 2008; Author et al, 2010). From 11 high quality studies researchers report a positive correlation between positive peer relationships and achievement, where 40% of the variation in an achievement effect size of +0.63 is accounted for by positive peer relationships (Roseth, Johnson & Johnson, 2008). The protective and adaptive functions of positive peer relationships have been shown in psychology (Deci & Ryan, 2002; Diener & Seligman, 2002).

Co-operative learning using peer tutoring has strong evidence of positive impact, with overall effect sizes of +0.48 (Higgins *et al.,* 2013) and effect sizes of +0.33 reported for tutor and +0.40 for tutee respectively (Cohen *et al.*, 1982). This paper focuses on cross-age peer tutoring, for which a meta-analysis reports evidence of positive impact with effect size of +1.05 when used in literacy interventions with adolescents (Jun, Ramirez & Cummings, 2010).

1.2 *Cross-age peer tutoring as a form of co-operative learning*

Peer tutoring is the acquisition of knowledge, understanding, skill and socio-emotional development during a process of working with peers in a co-operative manner. This kind of tutoring benefits both tutors and tutees on both the cognitive and affective levels (Cohen *et al.*, 1982). Cross-age tutoring is characterised by specific role taking as tutor or tutee, with high focus on curriculum or skills content and usually specific procedures for interaction, in which participants are trained. The roles remain fixed with the older peer being a tutor, the younger a tutee. Both tutor and tutee benefit with indicative average effect size of +0.48 (Higgins *et al.,* 2013), being particularly beneficial for children in areas of social disadvantage and for those with special educational needs (Author *et al.,* 2012).

Paired reading is a structured form of peer tutoring and is characterized by specific role taking as tutor or tutee, with high focus on error correction and clear procedures for interaction, in which participants receive training. When paired reading is implemented with reasonably high integrity, results are typically good (Hamblin & Hamblin, 1972; Topping, 1987; Van Keer, 2004; Van Keer & Verhaeghe, 2005). Paired reading focuses the contact and feedback from tutor to tutee on error correction (Topping, 2001). For optimal success in paired reading an attainment differential between tutors and tutees is required (Duran & Monereo, 2005). Without the appropriate gap both tutor and tutee can be under stimulated (Greenwood, Terry, Arreaga-Mayer & Finney, 1992). The form of paired reading described in this paper was demonstrated to be effective at scale during a two-year study in 129 primary/elementary schools involving 8-12 year olds across a school district in Fife, Scotland, reporting positive results for the technique with overall effect sizes of about +0.2 (Tymms *et al.,* 2011).

2. Methodology and methods

2.1 *Sample*

The programme, *Peer Tutoring in Secondary Schools,* was delivered in 10 schools as part of a RCT and engaged approximately 3000 young people in Northeast England across 120 classes. Approximately 1300 pupils (clustered by class) received the intervention for approximately 30 minutes, once per week for 16 weeks. There were 58 intervention classes taught by 62 teachers across the 10 schools, all of whom training to deliver the programme. Following training, teachers delivered 16 sessions in one academic school year. In each school, senior leaders were appointed as programme leads to oversee the programme and support the staff involved. All leads except for two attended training along with the intervention teachers. There were 13 school leads in total across 10 schools, of whom 9 were not involved in the delivery of the programme and 4 were involved as leads and teachers. For the purposes of this paper, teachers who were intervention teachers and also school leads are treated as intervention teachers only. Therefore, there were 62 intervention teachers and 9 support leads (not including those who were intervention teachers) involved in delivering the programme.

2.2 *Data collection*

All instruments for data collection were sent directly to teachers or school leads in electronic format. Although the identity of the respondents was known by the research team, respondents were informed that all names would be removed during analysis and for reporting purposes.

Online survey: All teachers (n=62) were invited to complete the online survey. The surveys were self-completed by a total of 61 teachers (98%) across the 10 schools over a period of 4 weeks, after 10 weeks of the 16-week intervention period.

Case studies: One month after programme delivery teachers were invited to complete a case study. School leads were also asked to complete a case study on behalf of the school. Case studies were completed during a four-week period by all 9 schools leads as requested. In addition, of the 62 intervention teachers 42 completed individual case studies across 9 schools. In 1 school teachers (n=9) worked collaboratively with the school lead and their views were submitted within one case study.

2.3 *Instruments*

2.3.1 *Design process of instruments*

Teacher perceptions were collected at different time points throughout the planning and implementation of the programme. The responses from each collection stage informed the adaptation of instruments used in the data collection of this study. First, prior to delivery during training day 1, all participants were invited to hypothesise about programme impact on their students. This initial data was gathered in written format from teacher 'talking points' in groups of 6. Second, midway through the intervention delivery staff were invited to express their perceptions about the programme using one-to-one video interviews. Themes arising from the initial teacher hypotheses and the video interviews informed the online survey and case study design.

2.3.2 *Teacher online survey*

An online survey was used to gather teacher perceptions about implementation and impact of the programme. Both quantitative and qualitative data were collected from this survey, divided into two main sections, with 8 and 7 responses in each respectively.

Section 1: This part of the survey was composed of 8 quantitative questions regarding implementation and fidelity to the programme. This section of the survey included 8 questions adapted from the teacher survey used in the Fife study. Questions 1-4 focused on the class and teacher's use of resources. Questions 5-8 focussed on how the pairs worked together, 'in-school' support mechanisms used and the numbers of peer tutoring sessions completed (Tymms *et al.,* 2011).

Section 2: This part of the survey was adapted from the Collaborative Learning Evaluation Form (Tolmie *et al.,* 2010) and the Continuing professional development evaluation questionnaire (Author *et al.,* 2008). Although, used in a slightly different format, during ScotSpring the items used to describe classroom implementation of peer tutoring, were reported to have good reliability with Cronbach's alpha values across the 17 items being 0.89. The survey that assessed teacher perceptions on impact on learning and students was adapted from the 10 items reported in the ScotSpring project. Items selected for Section 2 were adapted from the original survey to include references to reading aloud and reading enjoyment. Section 2 was designed to collect both quantitative and qualitative data of teacher perceptions. It was composed of 7 response statements requiring teachers to rank their perception of impact of the programme on students in various areas including confidence, enjoyment, communication, relationships, reading aloud and attainment. A quantitative six-point scale was used for each area (6 = high impact and 1 = low impact). The Cronbach's alpha for the 7 items was 0.89. After each area ranked, teachers were given space to provide qualitative data using narrative of their perceptions including rich examples.

2.3.3 *Post-programme teacher and school case studies*

Case studies were used for teachers on the peer tutoring intervention and its perceived effects on students. The original themes regarding impact which teachers hypothesised about during training, which were also used in the online survey, were used for this instrument. As a reflective tool, both school and teacher case study templates were composed of 7 and 8 sections respectively. In addition to school, teacher and student characteristics, the instrument was designed for teachers to reflect on their perceptions of peer tutoring for students and their pedagogy, and to think about future usability. Themes included perceptions about impact on student relationships, confidence, self-concept and reading. Templates were designed with a qualitative open format encouraging teachers and schools to shape their narrative, including rich examples using an authentic voice.

School Case Studies: The template was composed of 7 sections with the following foci: (1-2) school and student characteristics; (3-4) implementation issues including staff structures, staff subject areas and use of resources; (5-6) perceived benefits and challenges of peer tutoring for students and staff; (7) programme's future use.
Teacher case studies: The template was composed of 8 sections with following foci: (1-2) teacher and student characteristics; (3-4) implementation issues in the classroom, including support received and use of resources; (5-7) perceived benefits and challenges of peer tutoring for students and staff; (8) programme's future use.

Case studies were designed using a variety of questions differently phrased from those used during the online survey to enable the research team to check the previous teacher perceptions collected from the online survey for internal validity focusing on accuracy of fit, and for external validity deepening understanding of the subject through the combination of multiple readings (Glaser & Strauss, 1967). This instrument for use post-programme was designed to provide important information to help the research team monitor changes in teacher perceptions and to establish the extent to which common perceptions about the programme's impact persisted after its completion.

2.4 *Data analysis*

A mixed methods approach informed by grounded theory was adopted to gather and analyse teacher perceptions of the peer tutoring process and shaped data collection and interpretation, including understanding substantive meanings in the data (Glaser & Strauss, 1967; Strauss & Corbin, 1998).
Data analysis took an iterative form, with data sifted at 5 stages and coded at stage 3-4. Data was collated at each stage and themes were identified informing the sequential stage of data collection. Initial teacher hypotheses were collected during the 1 ½ training days pre-programme (stage 1). These themes informed the formation of questions for the semi-structured interviews mid-programme (stage 2). Data collected from the interviews was thematised in line with the emergent themes from previous analysis. These findings were further checked for plausibility at a post-programme collaborative event (stage 5), using respondent validation checking for the viability of the interpretation of emergent themes by the researchers. The initial thematic analysis of digital interviews, prior to the collaborative event was used to inform the questions included in the online survey completed 2/3 through

the programme (stage 3). The online survey was initially collated into one data set where quantitative data was identified and qualitative open questions were coded thematically using themes related to the key questions. These key themes then formed the basis for the more in depth case studies which teachers were asked to complete at the end of the programme (stage 4). The case study transcripts were input onto MAXQDA, the qualitative data analysis software and text was coded thematically using broad themes related to the key questions. From this broad coding, frameworks were developed within which to code data relating to (1) the impact of the paired reading programme on the different aspects of reading (2) (based on elements of social interdependence theory) the interplay of relationships between the tutors and tutees. The data was then coded again to highlight key themes. Coding was conducted by several members of the research team and discussed, enhancing internal validity.

Triangulation of data from case study and online survey instruments in particular provided a rich narrative in line with grounded theory (Strauss & Corbin, 1992). Two main themes emerge: (1) peer relationships, and (2) self-concept in reading. The various data collection points checked for internal validation (Glazer & Strauss, 1967). Based on Denzin, external validity was sought through triangulation of the data (1978). Therefore, both *methods triangulation* of quantitative and qualitative data, and *triangulation of sources* using various qualitative data collection points were used to ensure secure findings.

3. Results

In general, pre-programme data and digital interview data (stages 1-2) predicted improved relationships between students, improved confidence and reading. The original teacher perception findings from the pre-programme data and the digital interviews, informed the design of the mixed methods online survey and qualitative case study template. In this section findings of the quantitative data collected as part of the teacher survey are reported. The results of this quantitative data provide a general discussion of teacher implementation and fidelity to the programme. These results are then more fully explored using qualitative data collected from the online survey and the case studies.

3.1 *Perceptions about implementation and fidelity to the programme*

Teacher responses from the online survey (OS) suggest perception of effective implementation and fidelity to the programme, including structured support for staff. For example, of the 61 teachers who completed the online survey, 88% reported being well

supported most or all of the time during delivery, and 90% reported using the teacher manual and resources most or all of the time during delivery. Of the 61 teachers, 25% also reported adapting resources resulting in additional resources. Teachers described their adaptations as focused on the following:

> "*We made our own praise cards"*. (OS, School 5, Teacher 1)
>
> *"We collated a list of exemplar questions for non-fiction and fiction texts."* (OS, School 6, Teacher 2)
>
> *"Some additional starters to encourage thinking on team-working etc"* (OS, School 4, Teacher 6).

Teachers were also asked to report on the interactions between pairs and on the effectiveness of the technique. Of the 61 teachers, 94% reported that pairs worked well together during the programme, and that students either 'picked up the technique with no problems' (66%) or 'understood the technique most of the time' (34%). No teachers reported that students encountered significant problems.

Table 1: Teacher perceptions of the implementation of the programme

		Respondents (N=61)	Percentage of respondents
How well have you been able to implement peer tutoring technique with students?	Students picked up the technique with no problems	40	65.6
	Students understood the technique most of the time	21	34.4
	Significant problems	0	0
How closely did you follow the Peer Tutoring in Schools manual and resources?	Always	13	21.3
	Mostly	42	68.9
	Occasionally	6	9.8
	Never	0	0
Did you create any additional resources?	No	46	75.4
	Yes	15	24.6
	Always	29	47.5

How supported did you feel during the delivery of the programme?	Mostly Occasionally	25 7	40.9 11.5
Did the pairs you selected work well together?	Always Mostly Occasionally Never	4 53 4 0	6.6 86.9 6.6 0

From these results it can be concluded that teachers perceived being well supported during the delivery of the programme and a high degree of fidelity of implementation. Teacher adaptations to resources remained in line with the pedagogy and student technique. Implementation fidelity was also expressed by teacher perceptions about students using the paired reading technique effectively across classes including forming purposeful relationships in their pairs.

3.2 *Peer relationships*

As Paired Reading was a cross-age peer tutoring programme, the intervention had a particularly positive effect on the relationships across year groups:

> *"The two year groups developed effective relationships – they worked well together*." (Case Study, School 4, Teacher 7)

> *"I think Peer Tutoring has worked in some respects, for example with regards to working collaboratively, confidence for the Year 9s and social interaction." (CS,* School 2, Teacher 6)

> *"Students have formed purposeful relationships between year groups."* (CS, School 6, Teacher 3)

Findings from the online survey (OS) and case study (CS) data of teacher's pre-conceptions and experiences of peer tutoring during the programme suggest that intervention students' had improved peer relationships and social interactions between year groups. Teachers reported that the programme specifically helped student relationships by:

(a) Breaking down the attitude that older students in school are intimidating:

> *"At first the pupils did not like speaking or working with older/younger pupils but they soon overcame this and the year 9 pupils ended up being protective of the year 7 pupils.*" (CS, School 7)

"The relationships between the Year 7 and 9 students were greatly improved. Not only were they really supportive of their partners but they were communicating with each other in the corridors." (CS, School 2, Teacher 3)

"Social interaction between the year groups appeared to improve over the duration of the course. Year 7 were more confident in the presence of year 9."(CS, School 5)

"Relationships between Y9s and Y7s have strengthened considerably". (OS, School 6, Teacher 3)

(b) Providing an older student who can be a positive role model or 'mentor' for the year 7 student:

"The relationships that the year 9's formed with the year 7's were extremely positive. I could see that as time went on students confidence grew. It really showed how well my year 9 class could communicate with other students."(CS, School 4, Teacher 5)

Teachers also reported that the positive relationships formed, often resulted in friendships between many students:

"About 80% of students worked really well with their partners and friendships were formed." (OS, School 4, Teacher 2)

"Many relationships/friendships were developed as a result [of the programme]". (OS, School 2, Teacher 6)

Even where relationships were not perceived to result in friendship, teachers often reported that enhanced relationships resulted in more effective engagement and communication between students:

"On the whole, even if they were not fond of each other, they worked well and learned to engage with each other." (OS, School 2, Teacher 6)

"Explaining to younger students has stretched our Y9 students and made some of them much more aware of the need to express themselves clearly". (OS, School 3, Teacher 4)

Teachers perceived improved communication between the pairs as an effective element of co-operative learning:

"[Communication]has demonstrably improved in the pairings in my class, with Y7s in particular showing more confidence in communication. Additionally, Y9s have thought very carefully about their phrasing when instructing / praising their allocated Y7" (OS, School 6, Teacher 3)

"It has been nice to see the two year groups working together. The reading process has helped with communication skills, particularly the questioning and praise elements." (OS, School 9, Teacher 1)

"The year 7 students' communication skills have improved a lot during the programme and they are able to answer questions in more detail." (OS, School 9, Teacher 5)

Low ability students were perceived by many teachers to have benefitted most from the programme, with a perceived interplay between improved student relationships and impact on student confidence:

"Autistic boy in Year 7 has more confidence when reading aloud in lessons. I do think it is due to the relationship he has built with his tutor." (OS, School 3, Teacher 2)

3.3 *Self-Concept in Reading*

From the outset, teachers predicted that student's reading ability would improve as a result of the programme. However, when teachers were asked to comment on student's reading ability during and after the intervention, they often did not feel qualified to comment without test results to support their assertions.

"Whilst I have not got access to data following this study and am not completely sure, I do feel that there could be/have been benefits for my class as many students consistently showed a positive attitude towards Peer Reading. Lower ability students of my class could have benefitted especially." (CS, School 4, Teacher 4)

Nevertheless, in the online survey 62% of teachers reported moderate to high impact on students' reading attainment when asked to quantify their views. Although teachers were generally hesitant to comment on students' reading attainment qualitatively they used proxy indicators to evidence their perceptions of improved reading ability based on the changes they saw in reading behaviours between students. These reading behaviours were an increased confidence in reading aloud, wider vocabulary and a willingness to choose more difficult books to read.

3.3.1 *Confidence in reading aloud:*

After participating in the peer tutoring technique within their pair, teachers found that students were more comfortable when asked to read aloud in class.

"Within my classes I have observed pupils have more confidence to read and will volunteer to read aloud to the class."(CS, School 5)

"Obvious gain in confidence with reading aloud over the weeks"(CS, School 7, Teacher 1)

"The programme helped to combat confidence issues surrounding reading aloud."(CS, School 9, Teacher 3)

3.3.2 *Wider vocabulary:*

Paired reading provided a platform for students to read a greater amount and a wider variety of material. This mutual supportive structured process was perceived by teachers to enhance their vocabulary and motivation for reading more difficult books than they would have attempted prior to participating in the programme.

"I think students have improved their ability with difficult words – I have heard some of them read words that I think they would have found difficult at the start." (OS, School 1, Teacher 8)

"Students opted to go for more challenging books as the course continued" (OS, School 2, Teacher 4)

"Students with lower literacy abilities where choosing more difficult books to read and understanding them more with the help of a partner."(OS, School 7, Teacher 2)

3.3.3 *Lower ability readers:*

Lower ability students, commonly a difficult to reach group of students, was perceived by teachers to have benefitted most from the co-operative learning structure of paired reading. The benefits were perceived for both year groups, whether in the role of tutee or tutor.

"Worked well for lower ability students in year 7 and 9 both supporting and reading". (CS, School 7, Teacher 2)

"Working with older students was brilliant for the confidence of the lower ability students." (OS, School 4, Teacher 5)

"Lower ability Y7 students benefitted the most from this. The confident readers didn't gain as much." (CS, School 2, Teacher 2)

Teachers perceived the opportunity for lower ability students to have a position of responsibility as tutor and combined with a sense of common purpose for the tutee to succeed resulted in improved confidence and behaviour leading to more focused engagement in their learning.

"Reading aloud can sometimes be an issue for weaker readers and the programme has helped some students overcome this." (CS, School 9, Teacher 2)

"With certain students there was a positive impact, particularly lower level Y9s tutoring the Y7s" (OS, School 7, Teacher 2)

Teacher perceptions about the benefits of older students taking responsibility as tutor to support the tutee in their learning within the structure process of peer tutoring provided them with a sense of obligation. The role of tutor was observed by teachers to nurture a sense of maturity and trustworthiness in the student tutors which they perceived to be linked with enhanced attainment for the tutee and the tutor.

4. Discussion

The present study evaluated teacher perceptions of the implementation and impact of a peer tutoring programme, addressing the ease with which the students understood the peer tutoring technique, the relationships between the pairs and the use of the resources provided. Student and teacher structured resources were used in the peer tutoring programme to maximise the benefits of peer tutoring as a form of co-operative learning. Teachers reported in the online survey that they used the resources most or all of the time during programme delivery. When they gave examples of adapted resources, adaptations did not deviate from the pedagogy or technique. Social interdependence studies recommend structures be put in place for effective co-operative learning which includes social growth, including management aids for teachers and preparation time for students to familiarise with these structures (Blatchford *et al.,* 2006; Kutnick and Manson, 1998; Kutnick *et al.,* 2008; Roseth *et al.,* 2008; Wegerif, 2000). Using the structures provided for delivery, intervention teachers reported both that students effectively understood the co-operative learning technique and worked well together in their paired roles with positive effect.

The development of supportive student relationships through peer tutoring was explored further in the qualitative data collected in the online survey and case studies. Teacher's pre-conceptions and experiences during the programme suggest that students who received the programme had improved peer relationships and social interactions between year groups. Social interdependence theory predicts an interplay between positive social relationships and co-operative goal structures. Johnson and Johnson report that these social skills promote higher achievement and contribute to building positive relationships among group members (2009). For young adolescents these co-operative goal structures are associated with higher

levels of positive peer relationships (Johnson & Johnson, 2005) and improved achievement (Roseth *et al*., 2008).

When working towards the common goal of improving reading, positive relationships were formed between pairs and knowing another person is willing to assist in a task and work together promotes liking (Johnson & Johnson, 1972). Teachers attributed the friendships formed between tutors and tutees to the time spent working co-operatively during the programme.

Positive interdependence of this kind seems to enhance positive interaction between students where they support one another's efforts to complete the task. This process involves mutual assistance, sharing of structured resources, effective communication and an established relationship including trust (Johnson *et al.,* 2007). Teachers perceived this kind of co-operative learning between pairs during the peer tutoring intervention. They found that students developed the interpersonal skills needed for co-operation through this process and were motivated to use these skills. In particular, they noted that students grew to know one another and trust one another more, communicated effectively, and accepted and supported one another during the programme.

Teachers perceived improved communication between the pairs as an effective element of co-operative learning. Accurate communication, together with mutual trust and support help build positive relationships and can promote higher achievement (Johnson & Johnson, 2009). Teachers reported that low ability readers benefited most from improved communication skills as a result of the programme, with improved relationships linked to enhanced confidence.

Teacher perceptions about benefits of older students taking responsibility as tutor to support tutees in their learning within the programme provided them with a sense of obligation. Teachers observed that the role of tutor nurtured a sense of maturity and trustworthiness in the students perceived to be linked with enhanced attainment for the tutee and the tutor. This positive pattern of student interaction as an important element in co-operative learning has also been found in studies where co-operative learning leads to a form of positive feedback loop which is linked to achievement (Roseth et al. 2008). In particular studies support these findings with early adolescents (Roseth et al., 2008).

Our findings from this study suggest that teachers who engaged in leading peer tutoring in their classroom implemented the programme as it was designed, even where small adaptations were made to resources for contextual reasons. Teachers reported the following benefits of this kind of co-operative learning on their students: (1) Improved relationships between participating year groups, (2) improved social skills for both tutor and tutee, and (3) improved reading behaviours. Teacher perceptions indicate that these effects of co-operative learning lead to improved attainment in reading, particularly for low ability students. From the data collected, the benefits of peer tutoring for students using paired reading were predicted by teachers at the outset and for the majority remained consistent beyond the programme. This is supported by the similarity of the themes that emerged at every data collection point. Although teachers were not explicitly aware of the theories or its experimental applications, they believed in the potential of peer tutoring from the outset with reported high buy-in, and their perceptions of the effects of peer tutoring are congruent with social interdependence theory and research in this area.

5. Limitations

The research described in this study was carried out by the developers of the Peer Tutoring in Schools programme and it is acknowledged that this may have introduced a degree of response bias from the participants. It is also acknowledged that in-depth interviews with a sample of participants where not undertaken as part of this study and would be an additional element to give greater granularity to the findings. This would be recommended in future studies seeking to understand teacher perceptions of peer tutoring in their classroom to offer additional evidence of the efficacy and mechanisms by which cross-age peer-tutoring affects student reading, communication, and peer relationships, including the social benefits of peer tutoring and the structure that needs to be in place for these to accrue.

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6. Conclusion

Johnson and Johnson have found that ‘Conceptual understanding provides teachers with a framework to organise what they know about co-operative learning, to guide their practices and to integrate new knowledge’ (2009: 373). This study shows that teachers’ experiences of

the benefits of co-operative learning are supported by the theoretical model within social interdependence literature, even if they themselves do not have a clear conceptual understanding of the theory.

In respect of policy, creating large scale migration of instruction requires collective moral purpose and a shared theory of action (Gifford, 2010). It is often difficult to change student instruction during school reform without systematic subscription to the proposed reform (Ravitz, 2010). These factors themselves echo social interdependence theory (Johnson, Johnson & Roseth, 2010) as school reform requires: systematic structures of staff support, standardized resources and pedagogies promoting positive teacher interdependence, and teacher buy-in. All these elements were perceived by teachers in this study to have been in place, with positive effects on student engagement, relationships and learning.

Teacher perceptions in this study suggest they engaged with a new pedagogy and implemented the programme effectively. Teacher buy-in was enhanced with crucial elements in place: (a) they were well supported by school management, (b) were provided with and used a clear standardized resources and pedagogies, and (c) once training was complete, they had the freedom to contextualize resources for their classroom within the pedagogic guidelines. Participant teachers reported effective teacher buy-in of the programme including adherence to implementation and perceived positive impact for students. This study suggests that co-construction in standardized resources during a RCT gives teachers a sense of ownership which may be required for systematic teacher buy-in and should be respected and encouraged within the research community.

The pragmatic RCT design is advocated as a powerful tool to inform practice and policy in education as rigorous trials that are large and which reflect normal school practice are crucial to the development of evidence-based education (Torgerson & Torgerson, 2007; Torgerson, 2009). The large-scale RCT design within which this study was conducted was completed across a wide geographic region in the UK and included 120 classes with no attrition at the cluster level. This was the first peer tutoring trial of this scale in the secondary/high school stage of education in the UK. Intervention teacher reports in this study suggest that large trials, although complex are possible to conduct successfully in the secondary/high stage.

In particular, the trial setting of this RCT was designed in the real world environment of the school classroom. Although difficult to undertake, this kind of pragmatic trial aims to strengthen confidence in the ecological validity of the findings and produce the most useful information for practitioners (Torgerson & Torgerson, 2007). Owing to the size of the trial, timetabling complexities and freedom of teachers to adapt materials this pragmatic trial design included inevitable sacrifice of some standardization for realism. This is expected to result in natural variability in delivery (Gorard, 2013). Nevertheless, findings from this study indicate that teachers across the trial suggest successful implementation of the programme and coherence of benefits for participating students in the trial. Teacher perceptions also indicate that a trial of this size can be undertaken effectively in secondary/high schools, if these include the required staff buy-in and support structures, appropriate standardised resources, and allow a degree of co-production to contextualise resources for delivery.

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